Claims

What is claimed is:

1. A valve comprising:

means for regulating flow of a fluid through said apparatus and downstream components of said valve;

a chamber having an inlet and an outlet, said chamber in fluid communication with said means for regulating flow when said valve is in an open position;

means for sensing pressure located downstream from the inlet of said chamber; and

means for preventing transmission of elevated pressure to downstream components of said valve, said means for preventing transmission of elevated pressure in mechanical communication with said means for sensing pressure,

wherein upon exposure to a pressure greater than a target pressure range said means for sensing pressure triggers said means for preventing transmission of elevated pressure to block the inlet to said chamber, and wherein upon subsequent exposure to a pressure lower than the target pressure range, said means for sensing pressure triggers said means for preventing transmission of elevated pressure to open the inlet to said chamber.

2. A valve of claim 1 wherein said means for preventing transmission of elevated pressure to downstream components blocks the inlet to said chamber thereby isolating downstream components of said valve from pressure values that exceed a burst or fatigue life of the downstream components.

3. A valve of claim 1 wherein said means for preventing transmission of elevated pressure to downstream components and said means for sensing pressure comprises a pressure actuated

piston located within said chamber, wherein said pressure actuated piston comprises:

a shut off tip to reversibly block the inlet to said chamber to terminate further pressure increases inside said chamber;

a shaft extending from the shut off tip, the shaft in fluid communication with the inlet and outlet to said chamber unless the shut off tip is engaged blocking the inlet to said chamber; and

a pressure actuating surface responsive to pressure entering said apparatus, distal from the shut off tip, upon which a pressure greater than the target pressure range of said apparatus causes movement of said pressure actuated piston causing the shut off tip to block the inlet to said chamber.

4. A valve of claim 3 wherein the inlet to said chamber further includes a nozzle and wherein upon exposure to a pressure greater than a target pressure range, the shut off tip is seated within the nozzle thereby blocking the inlet to said chamber.

5. A valve of claim 3 further including a spring means such that pressure downstream of said valve drops to a pressure lower than the target pressure range, said spring means assists in moving said pressure actuated piston to disengage the shut off tip from the inlet to said chamber.

6. A valve of claim 3 wherein the shaft extending from the shut off tip has a flow-through core.

7. A valve of claim 1 wherein said means for regulating flow is upstream or downstream from said chamber.

8. A valve of claim 1 further including a filter system located downstream of said valve.

9. A combination of claim 8 wherein said filter system comprises filter components having an insufficient burst strength or fatigue life to withstand about 300 psi pressure or 100,000 cycles of 150 psi pressure-depressurization cycles.

10. A combination of claim 8 wherein said filter system is located in a refrigerator.

11. A combination of claim 8 further including a filtered fluid dispenser.

12. An apparatus comprising:

means for preventing transmission of elevated pressure to downstream components of said apparatus; and

means for sensing pressure downstream from said means for preventing transmission of elevated pressure,

wherein upon exposure to a pressure greater than a target pressure range, said means for sensing pressure triggers said means for preventing transmission of elevated pressure to reversibly isolate downstream components of said apparatus from pressure greater than the target pressure range for a period until a pressure less than the target pressure range is re-established.

13. An apparatus of claim 12 further including means for regulating flow of a fluid through said apparatus and downstream components thereof.

14. An apparatus of claim 13 wherein said means for regulating flow maintains a narrow target flow rate within a wide range of applied pressure.

15. An apparatus of claim 13 wherein said means for regulating flow comprises a flow control orifice with a

floating O-ring such that a substantially steady flow rate is maintained within the target pressure range.

16. An apparatus of claim 12 wherein upon subsequent exposure to a pressure less than the target pressure range, said means for preventing transmission of elevated pressure terminates isolation of the downstream components of said apparatus.

17. An apparatus of claim 12 further including a filter system.

18. An apparatus for removing contaminants from a liquid comprising:

filter components;

a pressure limiting valve, upstream from said filter components, said pressure limiting valve comprising:

means for preventing transmission of elevated pressure to downstream components of said apparatus; and

means for sensing pressure downstream from said means for preventing transmission of elevated pressure; and

means for regulating flow of the liquid through said apparatus, said means for regulating flow located upstream or downstream of said pressure limiting valve;

wherein upon exposure to a pressure greater than a target pressure range, said means for sensing pressure triggers said means for preventing transmission of elevated pressure to said filter components to reversibly isolate said filter components from the pressure greater than the target pressure range for a period until a pressure less than the target pressure range is re-established.

19. An apparatus of claim 18 wherein said filter components comprise a housing having insufficient burst strength or

fatigue life to withstand about 300 psi pressure or 100,000 cycles of 150 psi pressure-depressurization cycles.

20. An apparatus of claim 18 wherein said filter components comprise a diffusive filtration medium.

21. An apparatus of claim 18 wherein said filter components comprise a filtration medium capable of removing heavy, metals, chemical and microbiological contaminants.

22. An apparatus of claim 18 wherein said pressure limiting valve isolates said filter components from pressures greater than or equal to about 60 to about 120 psi.

23. An apparatus of claim 18 wherein said pressure limiting valve and said means for regulating flow of the liquid through said apparatus are combined in a single device

24. An apparatus of claim 18 wherein said filter components and said pressure limiting valve are located inside an appliance.

25. An apparatus of claim 24 wherein the appliance further comprises a filtered liquid dispenser.

26. An apparatus of claim 25 wherein the filtered liquid dispenser, when actuated by a user, relieves pressure within said pressure limiting valve that is sensed by the means for sensing pressure to trigger the means for preventing pressure increases to reverse isolation of said filter components.

27. An apparatus for removing contaminants from a liquid comprising:

a valve to prevent and sense pressure increases in components downstream from said valve such that said apparatus for removing contaminants can meet burst and

fatigue life requirements for a given filtration application;

a flow regulator in liquid communication with said valve to provide a substantially fixed rate of flow-through said apparatus for removing contaminants within a target pressure range that allows adequate reduction of contaminants throughout the target pressure range; and

filter components downstream from said valve, said components including a housing and a diffusive filtration medium contained within the housing, wherein said filter components have insufficient structural integrity to meet burst and fatigue life requirements for the given filtration application,

wherein upon exposure to a pressure greater than the target pressure range, said valve isolates said filter components and prevents transmission of the pressure greater than the target pressure range to said filter components until a pressure equal to or less than the target pressure range is re-established.

28. An apparatus of claim 27 wherein the diffusive filtration medium removes heavy metals, chemical contaminants, microbiological contaminants, or combinations thereof.

29. An apparatus of claim 27 wherein said valve comprises:

a chamber having an inlet and an outlet; and

a pressure actuated piston situated within the chamber, the piston comprising:

a shut off tip that reversibly blocks the inlet to the chamber to isolate said filter components from pressure greater than the target pressure range;

a shaft extending from the shut off tip, the shaft in fluid communication with said chamber unless the shut off tip is engaged thereby blocking the inlet to said chamber;

a pressure actuating surface responsive to pressure entering the chamber, the pressure actuating surface distal from the shut off tip, wherein a pressure greater than the target pressure range causes movement of said pressure actuated piston causing the shut off tip to block the inlet to said chamber; and

a spring means to assist in moving the pressure actuated piston to disengage the shut off tip from the inlet to the chamber.